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Docket 82966LMB  
Customer No. 01333

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of

Christine J. Landry-Coltrain, et al

SMALL POROUS POLYESTER  
PARTICLES FOR INKJET USE

Serial No. 10/028,130

Filed 20 December 2001

Group Art Unit: 1774

Examiner: Pamela R. Schwartz

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*Christine Tolhurst*  
Christine Tolhurst

*February 1, 2007*  
Date

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Commissioner for Patents

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Alexandria, VA. 22313-1450

Sir:

**APPEAL BRIEF TRANSMITTAL**

Enclosed herewith is Appellants' Appeal Brief for the above-identified  
application.

The Commissioner has already charged the Appeal Brief filing fee to  
Eastman Kodak Company Deposit Account 05-0225. A duplicate copy of this  
letter is enclosed.

Respectfully submitted,

*Lynne M. Blank*  
Attorney for Appellants  
Registration No. 42,334

Lynne M. Blank/ct  
Telephone: 585-477-7418  
Facsimile: 585-477-1148

Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the  
Examiner is requested to communicate with Eastman Kodak Company Patent Operations at  
(585) 477-4656.



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Alexandria, VA. 22313-1450

Sir:

**APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134**



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## **APPELLANT'S BRIEF ON APPEAL**

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 21-46, 48-51, 53 and 54 which was contained in the Office Action mailed 01/09/2006.

A timely Notice of Appeal was filed 04/09/2006.

### **Real Party In Interest**

As indicated above in the caption of the Brief, the Eastman Kodak Company is the real party in interest.

### **Related Appeals And Interferences**

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

### **Status Of The Claims**

Claims 1-54 are pending in the application.

Claims 1-20, 47 and 52 stand withdrawn from consideration as directed to a non-elected invention, pursuant to a restriction requirement made by the Examiner in an Office Action dated 09/04/2003, and the Applicant's election made in the Response dated 10/03/2003.

Claims 21-46, 48-51, 53 and 54 are being appealed.

Appendix I provides a clean, double spaced copy of the claims on appeal.

### **Status Of Amendments**

An Amendment was filed on October 14, 2005, prior to the Final Rejection. A Notice of Appeal was filed 04/09/2006.

### **Summary of Claimed Subject Matter**

The present invention relates to an inkjet recording element (pg. 1, lines 22-25; pg. 2, line 32) comprising a support (pg. 16, line 20 – pg. 17, line 19) having thereon an ink receiving layer capable of accepting an inkjet image (pg. 2, line 30 – pg. 3, line 8; generally, pg. 10, line 22 – pg. 16, line 19) comprising at least one layer (pg. 15, line 30 – pg. 16, line 5) comprising crosslinked porous

polyester particles (pg. 9, line 18 – pg. 10, line 21), wherein at least 58% of said crosslinked porous polyester particles (pg. 23, Table 4) have a diameter of less than 0.5 micrometers (pg. 2, lines 31-32; pg. 9, line 18 – pg. 10, line 16).

### **Grounds of Rejection to be Reviewed on Appeal**

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Are rejected Claims 21-46, 48-51, 53 and 54 unpatentable under 35 USC § 103(a) over Maeda et al. (Japanese Kokai Patent Application No. Hei 7[1995]137432)

### **Arguments**

#### **1. Rejection of Claims 21-46, 48-51, 53 and 54 under 35 USC § 103(a):**

The Examiner has rejected Claims 21-46, 48-51, 53 and 54 under 35 USC § 103(a) as being unpatentable over Maeda et al. (Japanese Kokai Patent Application No. Hei 7[1995]137432) for reasons of record stating, in an Office communication date 7/14/2005 :

*"Claims 21-46, 48-51, 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (Japanese Kokai Patent Application No. Hei 7[1995]137432). With respect to the new claim limitations, it is noted that the particles of Maeda et al. are cross-linked [0008]. With respect to the limitation of the percentage of particles with a mean particle size below 0.5 microns, Maeda et al. uses different terminology to recite particle size, but it appears that its ranges would overlap with those instantly claimed. Maeda et al. disclose a volume average particle size D that can be 0.5. microns. In addition, 70 wt % or more of the particles are in the size range of 0.5D2.OD (i.e. 0.25 microns to 1 micron). Applicants claim 21 requires that numerically at least 58% of the particles have a mean diameter of less than 0.5 micrometers. Since this is a numerical percentage that would permit will over 58% of the particles by weight to have particle sizes over 0.5 microns, the claim reads on Maeda et al. (the particle size ranges overlap). Such particle size distributions would clearly have been suggested by [0006] of Maeda et al. In addition, claim 29 states that the particles of claim 21 are "a component of an at least bimodal system"*

*including other (larger) particles. If this is the case then the percentage set forth in claim 21 is essentially nonlimiting. Claim 21 does not appear to recite the complete set of component particles which may be present.*

*The amendment to claim 29 does not overcome the applicability of the Maeda et al. reference. As it is written, the claim is broad enough for multiple "at least bimodal" systems to be present. Such multiple systems could cancel out the modality of the other systems that are present. Assuming that the porous particles of Maeda et al. are mono-modal when taken as a whole, when subdivided into such systems, one system would be present which was at least bimodal and would have a mean particle diameter of greater than 0.5 micrometers.*

*"Applicant's arguments filed April 13, 2005 have been fully considered but they are not persuasive. Rejection under 35 USC 112 has been withdrawn in view of applicants' amendments, but the record is unclear as to whether the values in the specification are actually numerical percentages of weight percentages. They have been treated as numerical percentages since there is nothing of record to demonstrate that a weight percentages was intended. Applicants state that Table B indicates at least a 4-fold increase in 60% gloss when more than 58% of the particles have a particle diameter of more than 58%. First, it would have been expected to one of ordinary skill in the art that gloss increases when smaller particles are used. If gloss is an important criteria, then one of ordinary skill in this art would have known to include smaller particles such as those commonly used in the art to form gloss layers. See for example Ogawa et al. (5,576,088), col. 5, lines 13-15. Results of increased gloss would be expected when smaller particles are included in the medium. While Maeda et al. may recognize certain drawbacks to the inclusion of small particles, one of ordinary skill in this art would have found it obvious to weigh all of the pros and cons of this aspect of the invention to determine appropriate sized particles for inclusion in the layer.*

*Second, some of the values in applicants' table are not understood. With respect to the comparisons, it is unclear how it was determined that the comparisons have no percentage of particles under .5 microns in size from data on mean particle diameter. If the average diameter is .682 microns, one would expect some percentage of the particles to have*

*diameters under .5 microns unless the particle size was carefully controlled to exclude all smaller particles. The Particles of Maeda et al. may have a weight average particle size of 0.5 microns which numerically would require more than half numerically to be less than 0.5 microns in size. Therefore, it would be expected that the range of particle sizes of Maeda et al. either overlaps with that of applicants or is not patentably distinct therefrom.*

*Contrary to applicants' arguments with respect to claim 29, the other modes of particles recited therein are not required to be and would not have been expected to be present in a different layer without an explicit recitation of this structure.*

*In an Office communication dated 1/09/2006, the Examiner states:*

*"Applicant's arguments filed October 17, 2005 have been fully considered but they are not persuasive. The 70% of Maeda et al. is a weight percentage. If there are 100 particles present in the layer of Maeda et al., 98 of them may be smaller than 0.5 microns in size and only two particles may be larger. Therefore, numerically, it may have at least 58% of the particles smaller than 0.5 microns and the ranges of the reference overlap with those instantly claimed. With respect to claim 29, applicants are not giving their claim language its broadest meaning. All of the cross-linked particles of the independent claim as a component of the system, therefore, not all of the particles in the system have to be cross-linked porous polyester particles as argued by applicants. According to the paragraph at the top of page 10 of applicants' specification the porous polyester particles may make up one mode of the system and each mode may have a large distribution of particles. Other modes can be present with particle sizes greater than 0.5 microns. Therefore applicants' invention as claimed is extremely broad. Applicants have not successfully limited the claimed invention to one with 58% of the particles (numerically) below a size of 0.5 microns, because other modes may be present and have particle sized above and/or below 0.5 microns in size. Since applicants' percentage is numerical, it cannot be compared directly to that of the applied art. In Table B, as explained by the specification at page 10, there are two modes and each mode may have particles that are above and below 0.5 microns in size. The Examiner has considered this table, but cannot give*

*it full consideration since zeros have been filled in for the control examples rather than the actual values. These values are required for the Examiner to consider the criticality of the claim limitations."*

Maeda relates to an ink absorbing layer comprising hollow crosslinked particles in a binder on the surface of a support. Maeda fails to mention the use of porous polyester particles smaller than 0.5 micrometers.

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations.

Maeda fails to mention the use of particles of diameter less than 0.5 micrometers and fails to mention the use of these particles to enhance the gloss of a coated layer. Maeda fails to mention the use of an ink receiving containing porous polyester particles, 58% of which have a diameter less than 0.5 micrometers and fails to mention the use of these particles to enhance the gloss, dry time and dye retention of a coated layer. In fact, the particle size range of the particles of Maeda range from 0.5-100 micrometers and Maeda teaches that, if the particle size is too small, the particles become impractical as an additive for a coating material. See paragraph [0006] of Maeda.

The following Table A, presented in the response, dated Feb. 19, 2004, was prepared to clarify the criticality of particle size by varying only this feature of the recording medium. Table A was derived by combining Tables 4 and 5 with the description of preparation of the elements on pages 23-26 of the specification. No new data or other information has been added in the preparation of this table.

**TABLE A**

<b>PE dispersion</b>	<b>Particle Size</b>	<b>Mode 1</b>	<b>Mode 2</b>	<b>Element</b>	<b>60° gloss</b>
		<b>Mean diameter (micron)</b>	<b>Mean diameter (micron)</b>		
PE-1	<0.5	0.356	--	1	36
PE-2	<0.5	0.181	0.351	2	72
PE-3	Mix	0.390	2.70	3	20
PE-4	Mix	0.470	2.24	4	28
PE-5	<0.5	0.174	0.391	5	70



PE-6		0.430	5.86	6	40
PE-7	>0.5	0.897	2.62	Control C-1	3
PE-8	>0.5	0.682	3.10	Control C-2	5
Commercial Product	--	--	--	Control C-3	88
Commercial Product	--	--	--	Control C-4	38

Table A indicates that coating made with porous polyester particles (1, 2, and 5) according to the present invention produce glosses higher than or equivalent to commercial products. Table A also illustrates that bimodal coatings in which at least one of the modes has a diameter of less than 0.5 micrometers (2, 3, 4 and 5) have improved gloss when compared to coatings (C-1 and C-2) made with particles of greater than 0.5 micrometers. This is also supported by the Declaration of Landry, paragraphs 4 and 5, included in the Evidence Appendix.

The Examiner has previously indicated that the particles of Maeda et al. may have a weight average particle size of 0.5 microns which numerically would require more than half numerically to be less than 0.5 microns in size and, therefore, it would be expected that the range of particle sizes of Maeda et al. either overlaps with that of applicants or is not patentably distinct therefrom. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. The unexpected results may also render the claims unobvious. The question of "sufficient specificity" is similar to that of "clearly envisaging" a species from a generic teaching. See MPEP § 2131.02. A 35 U.S.C. 102/ 103 combination rejection is permitted if it is unclear if the reference teaches the range with "sufficient specificity." As previously stated, Maeda fails to disclose that

58% of the porous polyester particles in the element must have a diameter less than 0.5 micrometers. According to Maeda, not only are the particles greater than 0.5 in mean diameter, but the particles of this size occupy more than 70 weight % of the total. See Maeda, paragraph [0006]. The coefficient of variation is also given for Maeda (see [0006]) as a value of 30% or less. Not only does Maeda use larger sized particles, but also tight size control, as indicated by 30% or less coefficient of variation. Therefore, Maeda does not provide the present range with sufficient specificity. In addition, the present invention provides surprising results, detailed below, which are unforeseen according to the disclosure of Maeda.

Maeda also fails to produce a reasonable expectation of success, as Maeda fails to mention that particles of size less than 0.5 micrometers prove useful in providing a coating with a combined benefit of reduced dry time, increased gloss and increased dye retention (paragraph [0026] of Maeda). Maeda also teaches that these particles are difficult to handle in coating materials, if they are either too small or too large. (see paragraph [0006]). Maeda fails to mention that in a distribution of particles of mean diameter less than 0.5 microns, more than 58% have a particle size of less than 0.5 microns and produce high gloss coatings with reduced dry times and increased dye retention. See paragraph [0006], [0020], and [0021] of Maeda.

Finally, Maeda fails to teach all of the limitations of the present claims as it fails to teach or disclose an ink receiving layer containing porous polyester particles in which more than 58% of the particles have a particle size of less than 0.5 microns. As a result, Maeda fails to support a prima facie case of obviousness under 35 U.S.C. 103(a).

Even assuming such a prima facie case is made, the reference to Maeda teaches away from the present invention by indicating in [0006] that smaller particles are difficult to handle as coating additives. According to Maeda, not only are the particles greater than 0.5 in mean diameter, but the particles of this size occupy more than 70 weight % of the total. See Maeda, paragraph [0006]. The present claims are limited to at least 58% of particles with a diameter of less than 0.5 microns. In addition, the present invention provides surprising combination of results of increased gloss, increased dye retention and reduced dry time when the particles are used as an additive in a coating, as illustrated by Elements 1, 2, and 5 in Table 5 on page 26 of the specification, at proportions of 58% or greater.

The Examiner indicates that [0006] of Maeda clearly indicates that 70 wt % or more of the particles are in the size range of 0.5D-2.0D (i.e. 0.25 microns to 1 micron), and, as a result, the particle size ranges overlap). Paragraph [0006] of Maeda et al states *“The inner pore-containing polyester particles are mainly comprised of a crosslinked resin obtained by performing polymerization after adding 5-99 wt% of a vinyl-based monomer to 1-95 wt% of a polyester resin (preferably, containing ionic groups in the range of 20-2000 eq/ton) obtained by condensing a polyhydric alcohol component and a polybasic carboxylic acid component, preferably 5 mol% or greater of an unsaturated polybasic carboxylic acid. The volume-average particle size D is in the range of 0.5-100  $\mu$ m. There are one or plural independent pores filled with gas or liquid or pores which are connected to each other with fine holes inside the particles. The porosity is in the range of 1-99 vol%. The volume-average particle size D of the particles used in the present invention is in the range of 0.5-100  $\mu$ m, preferably in the range of 1-50  $\mu$ m, more preferably in the range of 2-25  $\mu$ m, even more preferably in the range of 2-15  $\mu$ m, or most preferably in the range of 2-9  $\mu$ m. If the volume-average particle size is too small, binding of the particles becomes difficult. On the other hand, if the volume-average particle size is too large, the particles become impractical as an additive for a coating material. The particle size distribution of the particles used in the present invention should be such that the content of the particles with a size in the range of 0.5D-2.0D is 70 wt% or greater, preferably 80 wt% or greater, more preferably 85 wt% or greater, or most preferably 90 wt% or greater. In another way to describe this, the particle size range of 70 wt% or greater of the particles is preferably 0.6D-1.8D, more preferably 0.7D-1.5D, even more preferably 0.8D-1.3D, or most preferably 0.9D-1.2D. Also, the variation coefficient, a value obtained by dividing the standard deviation by the average value, should be 30% or less, preferably 20% or less, more preferably 15% or less, or most preferably 10% or less.”* The paragraph mentions nothing to indicate that 58% of the porous polyester particles would have a particle size of less than 0.5 microns. The mere fact that references can be modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). It is only with knowledge of Applicants invention that the specification of Maeda can be construed as suggested by the Examiner. Maeda provides no suggestion to utilize a majority of particles with a combine particle distributions of predominantly small particles with other size distributions to

improve gloss. It is only in hindsight and with the teachings of Applicants invention that the Examiner has concluded that the Maeda can be modified to produce the presently claimed invention requiring 58% of the porous polymer particles to have a diameter of less than 0.5 micrometers.

The present invention also provides surprising results. The following Table B, originally provided in a response, dated Nov. 23, 2004, was also prepared to further clarify the results obtainable with the inventive particles by combining Tables 4 and 5 with the description of preparation of the elements on pages 23-26 of the specification. No new data or other information has been added in the preparation of this table.

**TABLE B**

<b>PE dispersion</b>	<b>% Particle Size &lt; 0.5 micron</b>	<b>% Mode 1 &lt; 0.5 micron</b>	<b>% Mode 2 &lt; 0.5 micron</b>	<b>Element</b>	<b>60° gloss</b>
PE-1	100	100	0	1	36
PE-2	100	5.9	94.1	2	72
PE-3	88.2	88.2	0	3	20
PE-4	58.6	58.6	0	4	28
PE-5	100	45.1	54.9	5	70
PE-6	82.1	82.1	0	6	40
PE-7	0	0	0	Control C-1	3
PE-8	0	0	0	Control C-2	5

Table B indicates that at least a 4 fold increase in 60° gloss is achieved when more than 58% of the particles have a particle diameter of less than 0.5 microns. The "58%" is numerical, since it is derived from statistical numbers. According to Maeda, not only are the particles greater than 0.5 in mean diameter, but the particles of this size occupy more than 70 weight % of the total. See Maeda, paragraph [0006]. The present claims are limited at least 58% of particles with a diameter of less than 0.5 microns. The gloss advantage of the present invention would not flow naturally from the invention of Maeda, as illustrate by PE-7 (10.6% of particles having 0.897 diameter and 89.4% particles having diameter of 2.62 microns) and PE-8 (7.6% of particles having 0.682 diameter and 92.4% particles having diameter of 3.1 microns).

In addition, the present invention produces more surprising results than just improved gloss. The present invention produces a unique combination of benefits - reduced dry time, increased gloss and increased dye retention - all

together, by making one modification. Referring again to Table B, Comparative Examples 1 and 2 have low gloss with good dry time and good dye retention. Comparative Example 3 has good gloss and dye retention, but suffers from increased dry time. Comparative Example 4 has degraded dye retention, but acceptable gloss and dry time. It is only in the Inventive Examples that all three characteristics are improved. See pgs. 27, lines 1-11, Table 6 on pg. 29 and Table 5 on pg. 26.

The Examiner has requested that the "0" values be filed into the above Table. Unfortunately, the value indicated by the equipment utilized to make the measurement indicated the value as "0".

With respect to dependent Claims 29 or 31, the Examiner also indicates that, since the present inventive particles may be a component of a system of particles, it would appear that all of these claim limitations may be met by subdividing the particles disclosed by the prior art reference into different categories, so that a peak in particle size distribution is formed as set forth in claim 29 or 31 in one case, or so that there is a standard deviation of particle sizes as set forth by claim 30 in another. As illustrated above in Table A, bimodal distributions, which include at least one mode with a particle size of less than 0.5 micrometers is not taught by the reference and provides surprising results. Also, as discussed in paragraphs 13 - 15 of the Declaration of Leon, included in the Evidence Appendix, the present inventive particles are not a component of a system according Maeda. Again, the mere fact that references can be modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Maeda provides no suggestion to combine particle distributions of predominantly small particles with other size distributions to improve gloss. The Examiner indicates that, contrary to applicants' arguments with respect to claim 29, the other modes of particles recited therein are not required to be and would not have been expected to be present in a different layer without an explicit recitation of this structure. As indicated by the claim language, 58% of all of the porous particles present in the element must have a diameter less than 0.5 micrometers, regardless of how many layers are present in the element. If claim 29 is combined with claim 21, the flowing language results: An inkjet recording element comprising a support having thereon an ink receiving layer capable of accepting an inkjet image comprising at least one layer comprising crosslinked porous polyester particles, wherein at least 58% of said

crosslinked porous polyester particles have a diameter of less than 0.5 micrometers and wherein said crosslinked porous particles are a component of an at least bimodal system including at least one particle size system distribution mode of a mean particle diameter greater than 0.5 micrometers. In other words, the porous polyester particles may have a bimodal distribution which includes particles larger than 0.5 micrometers, but 58% of the porous polyester particles in the bimodal distribution must have a diameter less than 0.5 microns. Maeda makes no such disclosure.

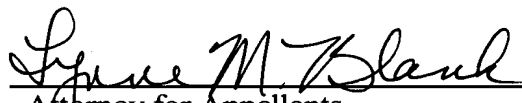
### **Summary**

Maeda fails to provide any likelihood of success, and fails to disclose all the limitations of the present claims. Maeda fails to suggest the modification necessary to achieve the present claims, as the teachings of Maeda lack sufficient specificity, and the present invention provides surprising results. As a result, the Applicants believe that the presently claimed invention is not obvious in view of Maeda.

### **Conclusion**

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims 21-46, 48-51, 53 and 54.

Respectfully submitted,

  
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Attorney for Appellants  
Registration No. 42,334

Lynne M. Blank/ct  
Telephone: 585-477-7418  
Facsimile: 585-477-1148  
Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

### **Appendix I - Claims on Appeal**

21. An inkjet recording element comprising a support having thereon an ink receiving layer capable of accepting an inkjet image comprising at least one layer comprising crosslinked porous polyester particles, wherein at least 58% of said crosslinked porous polyester particles have a diameter of less than 0.5 micrometers.

22. The inkjet recording element of claim 21 wherein said at least one layer further comprises a polymeric binder.

23. The inkjet recording element of claim 22 wherein said particles comprise between 50 and 95% by weight of said at least one layer.

24. The inkjet recording element of claim 22 wherein said particles comprise between 75 and 90% by weight of said at least one layer.

25. The inkjet recording element of claim 22 wherein said polymeric binder comprises poly(vinyl alcohol).

26. The inkjet recording element of claim 22 wherein said polymeric binder comprises sulfonated polyester.

27. The inkjet recording element of claim 22 wherein said polymeric binder comprises gelatin.

28. The inkjet recording element of claim 22 wherein said polymeric binder comprises water dispersible polyurethane.

29. The inkjet recording element of claim 21 wherein said crosslinked porous particles are a component of an at least bimodal system including at least one particle size system distribution mode of a mean particle diameter greater than 0.5 micrometers.

30. The inkjet recording element of claim 29 wherein said porous particles have a standard deviation in the mean diameter the value of which is between 0.3 times the mean particle diameter and 3 times the mean particle diameter.

31. The inkjet recording element of claim 29 wherein said system includes at least one particle size distribution mode of a mean particle diameter between 1 and 10 micrometers.

32. The inkjet recording element of claim 29 wherein said system includes at least one particle size distribution mode of a mean particle diameter between 1 and 3 micrometers.

33. The inkjet recording element of claim 21 wherein said porous polyester particles further comprise the copolymerization product of at least one ethylenically unsaturated monomer.



34. The inkjet recording element of claim 21 wherein said porous polyester particles further comprise the copolymerization product of at least one ethylenically unsaturated monomer selected from the group consisting of styrene, divinylbenzene, divinyl adipate and cyclohexanedimethanol divinyl ether.

35. The inkjet recording element of claim 21 wherein said polyester particle is made from a precursor polyester comprising at least one member the group consisting of maleic, fumaric, itaconic, phenylenediacrylic, citraconic and mesaconic acid.

36. The inkjet recording element of claim 35 wherein said polyester particle is made from a precursor polyester, wherein said precursor polyester further comprises sulfonated monomer.

37. The inkjet recording element of claim 35 wherein said polyester particle is made from a precursor polyester, wherein said precursor polyester has an acid number of at least 10.

38. The inkjet recording element of claim 35 wherein said polyester particle is made from a precursor polyester, wherein said precursor polyester has a molecular weight of 1,000 to 30,000.

39. The inkjet recording element of claim 21 wherein said element further comprises at least one layer comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers.

40. The inkjet recording element of claim 39 wherein said at least one layer comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers is located below said layer comprising porous particles having a mean diameter of less than 0.5 micrometers.

41. The inkjet recording element of claim 40 wherein said at least one layer comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers further comprises porous polyester particles having a mean diameter of less than 0.5 micrometers.

42. The inkjet recording element of claim 40 wherein said at least one layer comprising porous polyester particles comprising porous polyester particles having a mean diameter of less than 0.5 micrometers further comprises porous polyester particles having a mean diameter of greater than 0.5 micrometers.

43. The inkjet recording element of claim 40 wherein said at least one layer comprising porous polyester particles comprising porous polyester particles having a mean diameter of less than 0.5 micrometers further comprises porous polyester particles having a mean diameter of greater than 0.5 micrometers

and wherein said at least one layer comprising porous polyester particles comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers further comprises porous polyester particles having a mean diameter of less than 0.5 micrometers.

44. The inkjet recording element of claim 40 wherein said layer comprising porous particles having a mean diameter of less than 0.5 micrometers has a thickness of between 1 and 20 micrometers.

45. The inkjet recording element of claim 40 wherein said layer comprising said at least one layer comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers has a thickness of between 5 and 50 micrometers.

46. The ink receiving layers of claim 40 having a combined thickness of between 6 and 65 micrometers.

48. The inkjet recording element of claim 21 wherein said element is a single layer and has a surface gloss of greater than or equal to 20 at 60 degrees.

49. The element of Claim 21 wherein said support is paper or a coated paper.

50. The element of Claim 21 wherein said support is selected from the group consisting of poly(ethylene terephthalate), a polyolefin-coated and a polyolefin-laminated paper.

51. The element of Claim 21 wherein said support is transparent.

53. An inkjet recording element comprising a support having thereon an ink receiving layer capable of accepting an inkjet image comprising at least one layer comprising crosslinked porous polyester particles, wherein at least 58% of said crosslinked porous polyester particles have a diameter of less than 0.5 micrometers, and at least one layer comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers which is located below said layer comprising said crosslinked porous particles having a diameter of less than 0.5 micrometers.

54. An inkjet recording element comprising a support having thereon an ink receiving layer capable of accepting an inkjet image comprising at least one layer comprising crosslinked porous polyester particles, wherein at least 58% by weight of said crosslinked porous polyester particles have a mean diameter of less than 0.5 micrometers, and at least one layer comprising porous polyester particles having a mean diameter of greater than 0.5 micrometers in combination with crosslinked porous polyester particles having a mean diameter of less than 0.5 micrometers which is located below said layer comprising

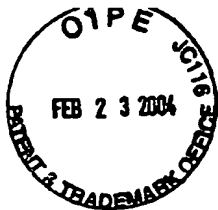
crosslinked porous polyester particles, wherein at least 58% of said crosslinked porous polyester particles have a mean diameter of less than 0.5 micrometers.

## **Appendix II – Evidence**

- A. Declaration Under Rule 132 – Christine J. Landry-Coltrain – This declaration was submitted in Applicants' Amendment received February 23, 2004 and was duly entered by the Examiner.
- B. Declaration Under Rule 132 – Jeffrey W. Leon – This declaration was submitted in Applicants' Amendment received February 23, 2004 and was duly entered by the Examiner.
- C. Second Declaration Under Rule 132 – Christine J. Landry-Coltrain - This declaration was submitted in Applicants' Amendment received November 26, 2004 and was duly entered by the Examiner.
- D. Second Declaration Under Rule 132 – Jeffrey W. Leon - This declaration was submitted in Applicants' Amendment received November 23, 2004 and was duly entered by the Examiner.

None

**Appendix III – Related Proceedings**



82966LMB  
Customer No. 01333

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Christine J. Landry-Coltrain, et al

SMALL POROUS POLYESTER  
PARTICLES FOR INKJET USE

Serial No. 10/028,130

Filed 20 December 2001

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22313-1450

Group Art Unit: 1774

Examiner: Pamela R. Schwartz

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Alexandria, VA 22313-1450.

*Christine Polhurst*  
Christine Polhurst

*February 19, 2004*  
Date

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**DECLARATION UNDER RULE 132**

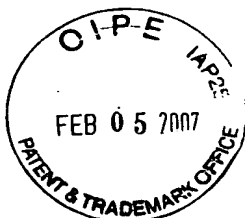
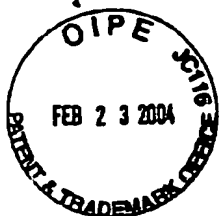
1. I, Christine J. Landry-Coltrain, state that I am a resident of Fairport, N.Y., in the county of Monroe and am a citizen of the United States. I obtained a Bachelor of Science degree in McGill University from Montreal, Canada in 1980. I also have a Ph.D. degree from the University of Wisconsin in Madison Wisconsin in 1985, with a focus on polymer science. I have been an employee of Eastman Kodak Company (hereinafter referred to as Kodak) since 1985. I have been assigned to work in research and development in areas relating to polymer science, such as polymer blends and composites, and media development, such as inkjet and thermal media, and studies relating to the physical properties of polymers.
2. I am one of the co-inventors of U.S. Serial No. US 10/028,130.
3. I have read the Office Action issued on November 19, 2003 and I am familiar with the references cited therein.



4. Element 1 (prepared from particles showing a mean diameter of 0.356 microns, see Table 4 (PE-1)) shows a gloss value of 36. Control Element C-1 (prepared from particles showing a mean diameter of  $> 0.897$  microns, see Table 4 (PE-7)) shows a gloss value of 3, much less than Element 1. All the particles used in Elements 1-6 have their most prevalent size (mode with greater than 50 % (proportion)) less than 0.5 microns. These all show high gloss. Control examples C-1 and C-2 show lower gloss because the particles used are mostly  $> 0.5$  microns.
5. With respect to Claims 29, 30, and 31, the majority of our particles have a mean diameter less than 0.5 microns. Claims 29 and 31 just say that there could be some particles that are larger. This is illustrated in Element 6 (prepared from particles PE-6; see Table 4), for example, where the particles used have predominantly (82.1%) a mean diameter 0.43 microns but also have a component fraction (17.9%) that have a larger size of 5.86 microns.
6. The particles from Maeda are described as having a mean diameter  $> 0.5$  microns, thus indicating they are monomodal (they teach this) and do not have a majority of particles less than 0.5 microns.
7. I further declare that all statements made herein of my own knowledge are true and that the statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Date: 2-3-04

  
Christine J. Landry-Coltrain



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Customer No. 01333

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In re Application of:

Christine J. Landry-Coltrain, et al

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PARTICLES FOR INKJET USE

Serial No. 10/028,130

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Examiner: Pamela R. Schwartz

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*Christine Polburst*  
Christine Polburst

*February 19, 2004*  
Date

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**FEB 27 2004**

**DECLARATION UNDER RULE 132**

1. I, Jeffrey W. Leon, state that I am a resident of Rochester, N.Y., in the county of Monroe and am a citizen of the United States. I obtained a Bachelor of Science degree in Chemistry from State University of New York (SUNY) in Albany, NY in 1989. I was an employee of Schenectady Chemicals in Schenectady, New York in 1989 as a resins chemist. I received a PhD in Chemistry from the University of Rochester, Rochester, NY in 1994, relating to photodegradation of polyester coatings. I did Postdoctoral work at Cornell University, in Ithaca, New York, from 1994-1996, relating to synthesis of dendrimeric polymers. I have been an employee of Eastman Kodak Company (hereinafter referred to as Kodak) since 1996. I have been assigned to work in research development relating to synthesis of latex polymer particles and beads, thermoreactive polymers, inkjet receiver media, polyester synthesis, and water-borne coatings.
2. I am one of the co-inventors of U.S. Serial No. US 10/028,130.
3. I have read the Office Action issued on November 19, 2003 and am familiar with the references cited therein.

4. It would have been obvious to one of ordinary skill in the art to treat the surface of the medium of the reference in order to obtain a desired level of gloss." In my opinion, it was not obvious to one of ordinary skill in the art to use particles of less than 0.5 to produce a glossy surface. As explained in the following paragraphs 5-7.
5. It is known in the arts of coating and colloid science that smaller particles are more prone to flocculation during drying processes than larger ones. Flocculation results in smaller particles forming larger clusters, which impart larger feature sizes to a coating. This very often results in less gloss.
6. It is known in the arts of coating and colloid science that coatings of smaller particles will build up large capillary stresses, which will result in mudcracking (and thus loss of gloss) of the coatings. Larger particles are less prone to this phenomenon.
7. Smaller particles often necessitate the use of larger amounts of binder in the coating, which will decrease ink absorption speed. It is well known that the increased surface area of smaller particles typically require more binder to cover the surface of the particles.
8. The cited reference Maeda teaches *away* from particles with a size of  $< 0.5$  microns. See paragraph [00061] "The volume-average particle size D of the particles used in the present invention is in the range of 0.5-100 microns, preferably in the range of 1-50 microns, more preferably in the range of 2-25 microns.... If the volume-average particle size is too small, binding of the particles becomes difficult."
9. The calendaring mentioned by the Examiner involves the application of pressure. Porous particles can be crushed during calendaring so this is often not an option. Calendaring requires an extra step, which is not desirable and may not even be feasible in a production process. Calendaring teaches nothing about particle size selection, which produces a glossy surface.
10. In paragraph [0006], Maeda states that the polyester resin is "...obtained by condensing a polyhydric acid alcohol component and a polybasic carboxylic acid component, preferably 5 nmole% or greater of an unsaturated polybasic carboxylic acid." In paragraph [0009], Maeda gives preferred amounts of

unsaturated polybasic carboxylic acids in the polyester resin. The percentages of carboxylic acid monomer, which compose the polyester resin, are unrelated to the final acid number and the acid number cannot be calculated from these percentages.

11. When polyester resins are prepared, the carboxylic acid groups of the polybasic carboxylic acid monomers are reacted with alcohols to form esters. The acid number is an indication of the amount of acid units, which are left unreacted (ie. which are not converted to esters). Thus without knowing the extent of conversion of the polymerization reaction, the molecular weight of the polyester resin, and the ratio of acid units to alcohol units during the polymerization reaction, and the extent to which acid units were destroyed or formed during side reactions, it is impossible to calculate the acid number of the polyester resin.
12. Incidentally, if the polyester recipes given in the examples of the present invention were carried out to their theoretical maximum extent of reaction, the acid numbers would be ZERO for each.
13. The Examiner states "...claims 29-31 which relate to particle size distributions. Since applicants indicate that their particles may be a component of a system of particles, it would appear that all of these claim limitations may be met by subdividing the particles disclosed by the prior art reference into different categories, so that a peak in particle size distribution is formed as set forth in claim 29 or 31 in one case, or so that there is a standard deviation of particle sizes as set forth by claim 30 in another. The particles of Maeda cannot simply be divided into different categories, so that a peak in particle size distribution is formed as set forth in claim 29 or 31. Claims 29 and 31 refer to the "mode." A mode is a "hump" in a distribution curve. Mathematically, it is a point in a curve where the first derivative equals zero. A gaussian distribution will have only one mode. A multimodal distribution will have multiple points on the curve where the first derivative equals zero. The modality of a distribution is a critical feature of particles, which can influence many different properties. Maeda makes no mention at all of the modality of his distributions.
14. Claim 30 talks about our distribution as *a whole*. To satisfy the conditions of claim 30, the particles of Maeda would have a coefficient of variation of 0.3 to



3.0, that is, 30-300%, as the standard deviation equals the standard deviation/mean. The coefficient of variation is a measure of the "narrowness" of the distribution. At the end of paragraph [0006], Maeda states "Also, the variation coefficient (*same thing as CV*), a value obtained by dividing the standard deviation by the average value, should be 30% or less (*ie. 0.3*), preferably 20% or less, more preferably..." Thus Maeda teaches away from the conditions of Claim 30. Maeda says the distribution should be narrow. The present invention says the distribution should not be so narrow.

15. Furthermore, the distribution specified by Meada (having a  $CV < 30\%$ ) is a "narrow" distribution. The distribution, which fulfills the conditions of claim 30 (having CV greater than or  $= 30\%$ ), is a "broader" distribution than that of Maeda. Thus it is impossible to "take a cut" of Maeda's distribution (either literally or theoretically) which will satisfy the specifications of Claim 30. In other words, you cannot "subdivide" a narrow peak into a portion which is wider than the parent.
16. I further declare that all statements made herein of my own knowledge are true and that the statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Date: 2/19/04

Jeffrey W. Leon  
Jeffrey W. Leon

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In re Application of:

Christine J. Landry-Coltrain, et al

SMALL POROUS POLYESTER  
PARTICLES FOR INKJET USE

Serial No. 10/028,130

Filed 20 December 2001

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22313-1450

Group Art Unit: 1774

Examiner: Pamela R. Schwartz

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*Christine Polburn*  
Christine Polburn

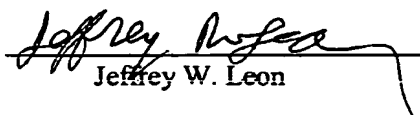
*November 23, 2004*  
Date

**SECOND DECLARATION UNDER RULE 132**

1. I, Jeffrey W. Leon, state that I am a resident of Rochester, N.Y., in the county of Monroe and am a citizen of the United States. I obtained a Bachelor of Science degree in Chemistry from State University of New York (SUNY) in Albany, NY in 1989. I was an employee of Schenectady Chemicals in Schenectady, New York in 1989 as a resins chemist. I received a PhD in Chemistry from the University of Rochester, Rochester, NY in 1994, relating to photodegradation of polyester coatings. I did Postdoctoral work at Cornell University, in Ithaca, New York, from 1994-1996, relating to synthesis of dendrimeric polymers. I have been an employee of Eastman Kodak Company (hereinafter referred to as Kodak) since 1996. I have been assigned to work in research development relating to synthesis of latex polymer particles and beads, thermoreactive polymers, inkjet receiver media, polyester synthesis, and water-borne coatings.
2. I am one of the co-inventors of U.S. Serial No. US 10/028,130.
3. I have read the Office Action issued on November 19, 2003 and am familiar with the references cited therein.

4. For the method of preparation of the polyester-containing particles of this invention, different emulsification methods are used. It is the choice of emulsification method, which, of all of the reaction parameters, most strongly influences the resulting particle size. Hence different emulsification methods are commonly used to make particles which differ in particle size.
5. Higher shear methods, such as microfluidization, will typically give smaller particles than, for example, homogenization using a Silverson Mixer.
6. After emulsification, a dispersion results which consists of droplets of the ethylenically unsaturated monomer(s) (in this case, divinylbenzene), the polyester, and the porogenic solvent (in this case, toluene). As the crosslinking reaction is initiated, the droplet becomes a porous microsphere. The composition of the porous microsphere would not be expected to be different if it was formed from a smaller or larger droplet.
7. The microsphere should be the same regardless of the type of emulsification used except that the size will be different. Any scientist trained in the art would expect the composition and porous morphology of the particles to be the same regardless of the type of emulsification used. Only the particle size is affected.
8. To achieve the variety of particle sizes necessary to evaluate the present invention, different emulsification techniques were utilized.
9. I further declare that all statements made herein of my own knowledge are true and that the statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Date: 11/18/04

  
Jeffrey W. Leon



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Customer No. 01333

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Examiner: Pamela R. Schwartz

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*Christine Polhurst*  
Christine Polhurst

*November 23, 2004*  
Date

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2. I am one of the co-inventors of U.S. Serial No. US 10/028,130.
3. I have read the Office Action issued on July 29, 2004 and I am familiar with the references cited therein.



4. The following particles evidences the functionality of the present invention utilizing different materials contained in the category of polyesters that is now claimed.
5. Two bead preparations were made: PE-12: Small beads of invention and PE-11: Large beads not of invention
6. Preparation of Large beads (PE-11):

An organic phase consisting of 90.00 g Fineclad® 385 (a nonionic, oil-soluble, unsaturated aliphatic polyester resin obtained from Reichhold Co.), 7.2 ml hexadecane, 1.80 g AIBN, 45.0 g divinylbenzene (mixture of *m* and *p* isomers, 80% with remainder being ethylstyrene) and 45.0 g chloromethylstyrene (mixture of *m* and *p* isomers) dissolved in 60180.0 g toluene was prepared. An aqueous phase consisting of 14.4 g dodecanethiol-endcapped acrylamide oligomer (prepared exactly as described in U.S. Patent No. 6,127,453, col. 9, lines 40-55) dissolved in 1080.0 g deionized water was combined with the organic phase in a 2L beaker and the mixture was homogenized for 10 minutes using a Silverson L4R mixer at the highest speed setting. The resulting dispersion was transferred to a 3-neck round bottom flask outfitted with a condenser, nitrogen inlet, and mechanical stirrer, bubble degassed with nitrogen for 10 minutes, and was heated for 16 hours at 70°C in a constant temperature bath under a positive pressure of nitrogen. 26.3 g N,N-dimethylethanolamine was added and the dispersion was allowed to stir at 80°C for 24 hours. The resulting dispersion of quaternized particles was subjected to rotary evaporation until the collected condensate came over as one phase. The dispersion was filtered through four ply cheesecloth and was purified further by diafiltration with 8 volumes of water through a 100K cutoff membrane using a Millipore Amicon® ultrafiltration apparatus and concentrated to 21.3% solids. The mean particle size of the washed dispersion was determined to be 3.26 µm (CV = 40.04%, Proportion = 100 %) using a Horiba LA-920® particle size analyzer.

7. Small beads (PE-12)

The same aqueous and organic phases described for PE-11 were prepared and combined. The combined phases were emulsified by a two-step process consisting homogenization for 5 minutes using a Silverson L4R mixer followed by passage twice through a microfluidizer. The emulsified reaction mixture was transferred to a 3-neck round bottom flask outfitted with a condenser, nitrogen inlet, and mechanical stirrer, bubble degassed with nitrogen for 10 minutes, and was heated for 16 hours at 70°C in a constant temperature bath under a positive pressure of nitrogen. 26.3 g dimethylethanolamine was added and the reaction was stirred overnight at 70°C. The resulting dispersion of quaternized particles was subjected to rotary evaporation until the collected condensate came over as one phase. The dispersion was filtered through four ply cheesecloth and was purified further by dialysis for 16 hours using 12-14K cutoff dialysis tubing. The resulting dispersion was freeze-dried to obtain 142.5 g of a fine white powder which was easily redispersible in water. The particle size was found to be 0.371  $\mu\text{m}$  (CV = 29.11%, Proportion = 100 %) using a Horiba LA-920® particle size analyzer.

8. Preparation of Element using P-12 small invention beads of Fineclad polyester

A coating composition was prepared from 10.2 wt. % of porous particles PE-12, 1.8 wt. % poly(vinyl alcohol), PVA, (Gohsenol® GH-17 from Nippon Gohsei Co.), and 88 wt. % water. [The relative proportions of porous polyester particle to PVA are therefore 85/15 by weight]. The solution was coated onto a base support comprised of a polyethylene resin coated photographic paper stock, which had been previously subjected to corona discharge treatment, using a calibrated coating knife, and dried to remove substantially all solvent components to form the ink receiving layer. The thickness of the dry ink receiving layer was measured to be about  $25 \pm 2 \mu\text{m}$ .

9. Preparation of Control Element using P-11 large beads of Fineclad polyester  
A coating composition was prepared from 71.76 wt. % of the PE-11 aqueous dispersion, 2.7 wt. % poly(vinyl alcohol), PVA, (Gohsenol® GH-17 from Nippon Gohsei Co.), and 25.53 wt. % water. [The relative proportions of porous polyester particle to PVA are therefore 85/15 by weight]. The solution was coated onto a base support comprised of a polyethylene resin coated photographic paper stock, which had been previously subjected to corona discharge treatment, using a calibrated coating knife, and dried to remove substantially all solvent components to form the ink receiving layer. The thickness of the dry ink receiving layer was measured to be about  $38 \pm 2 \mu\text{m}$ .

10. Gloss Assessment of Coated Elements

Element	Cyan D-max	60° gloss	Mean diameter (micron)	Proportion (%)
P-12	1.9	47	0.37	100
Control P-11	1.4	2.4	3.3	100

The above results show that high surface gloss for the element containing porous polyester particles can only be achieved with the incorporation of porous polyester particles that have a mean diameter of less than 0.5 micrometers, compared to the control elements having only porous polyester particles that have a mean diameter of greater than 0.5 micrometers.

11. I further declare that all statements made herein of my own knowledge are true and that the statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Date: Nov-19-2004

  
Christine J. Landry-Coltrain